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(Translation)

**Korean Intellectual Property Office
Notice of Preliminary Rejection**

Applicant : SEIKO EPSON CORPORATION
Attorneys : Doo-Hyun Moon, et. al.
Application No. : 10-2001-0062905
Title of Invention : DRIVING CIRCUIT, ELECTRONIC EQUIPMENT AND
ELECTROOPTIC DEVICE INCLUDING ORGANIC ELECTRO
LUMINESCENCE ELEMENT

As the result of the examination of the subject application, there have been found the following grounds for rejection and you are notified of them under Article 63 of the Patent Act. If you wish to respond to this action or to make amendment, please file your response and/or amendment by **January 28, 2004**. The period for responding to the office action may be extended for one(1) month each upon request and no approval therefore will be issued.

[Grounds for Rejection]

The invention described in claims 1 to 52 of the subject application could have easily been made by reference to the following by a person skilled in the art which the invention pertains to before filing this application. Therefore, this application will not be granted registration under Article 29(2) of the Patent Act.

[Details]

1. The invention described in the above claims of the subject application is to apply the reverse bias to the pixels of an organic electro luminescence display. It compresses the switch for selecting one of two voltage levels in one electrode of the pixel, and the control of the reverse bias of the above switch is done by an individual pixel unit, a line unit, a predetermined area unit or a whole screen.

2. Reference 1 is related to a method of applying inverse voltage for preventing accumulation of the electric charge of the organic electro luminescence display and the characteristic deterioration by the accumulation thereof. In figure 3a of Reference 1, the voltage applied to the cathode of the electro luminescence element is selected to be Vdd or Ground according to On/off of switch Q3.

Reference 2 is to remove the space electric charge of the organic electro luminescence display. A method, wherein the terminal T(figures 1 and 3) connected to the cathode of electro luminescence element by the selection circuit(2 of figure 1) controlled by the blanking signal has two voltage levels, and the reverse bias is applied to the electro luminescence

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element through the selection of the above voltage level during the non-displaying period, is disclosed in reference 2.

3. The invention described in the above claims of the subject application, References 1 and 2 have the same objective to prevent the accumulation of the electric charge by applying the reverse bias to the organic electro luminescence element; and have similarities in that they comprise the switch selecting the voltage level to be applied to one electrode of electro luminescence element and two voltage levels.

Only, in the method applying the reverse bias, this invention classifies its control unit into a pixel unit, a line unit and a whole screen, but it could have easily been made by adjustment by a person skilled in the art according to driving method.

Therefore, the invention described in claims 1 to 52 of the subject application could have easily been made by reference to Reference 1 or Reference 2 by a person skilled in the art which this invention pertains to.

[Attachment]

1. Reference 1 : Korean Unexamined Utility Model Publication No. 1999-30880 (July 26, 1999)
2. Reference 2 : Japanese Unexamined Patent Publication No. 2000-268957 (September 29, 2000)

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(54) 유기 미발 장치의 구동회로

요약

본 고안은 유기 미발(EL) 장치의 구동회로에 관한 것으로서, 더욱 구체적으로는 직류전원사용에 따른 전하의 축적을 방지하도록 역전압을 인가하여 유기 EL 장치의 수명을 연장시킬 수 있으며, 또한 역전압을 인가하는 경우에도 유기 EL 장치에서 등화상을 표현하는데 전혀 지장을 주지 않도록 구성된 유기 EL 장치의 구동회로에 관한 것이다.

본 고안의 유기 EL 장치의 구동회로는, EL 소자를 구동시키기 위한 쉘먼 드라이버와, 세그먼트 드라이버, 그리고 정전류 드라이버를 포함하는 유기 EL 장치의 쉘먼 드라이버부의 다수의 선택라인에 전압(Vd)을 공급할 수 있는 수단을 연결하고 쉘먼 드라이버부의 라인에 선택되면 로우전압을 인가하고 세그먼트 드라이버로부터 출력데이터에 따라서 온/오프 제어되도록 구성하며, 라인이 선택되지 않으면 하이전압을 인가하도록 구성된 것을 특징으로 한다.

도면

도 1

도 2a

도면의 간단한 설명

도 1은 종래 사용되는 유기 EL 장치의 개략적인 구성도,

도 2a는 쉘먼 드라이버부의 회로도, 도 2b는 세그먼트 드라이버부의 회로도,

도 3a는 본 고안에 의한 쉘먼 드라이버부의 회로도, 도 3b는 본 고안에 의한 세그먼트 드라이버부의 회로도이다.

도면의 주요 부분에 대한 부호의 설명

1 : 쉘먼 드라이버, 3 : 세그먼트 드라이버,
5 : 정전류 드라이버, Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8 : 트랜지스터,
R1, R2 : 저항.

고안의 상세한 설명

고안의 목적

고안이 속하는 기술 및 그 분야의 종래기술

본 고안은 유기 미발(EL) 장치의 구동회로에 관한 것으로서, 더욱 구체적으로는 직류전원사용에 따른 전하의 축적을 방지하도록 역전압을 인가하여 유기 EL 장치의 수명을 연장시킬 수 있으며, 또한 역전압을 인가하는 경우에도 유기 EL 장치에서 등화상을 표현하는데 전혀 지장을 주지 않도록 구성된 유기 미발(EL) 장치의 구동회로에 관한 것이다.

종래 사용되는 유기 EL 장치는 캐소드(cathode)와 애노드(anode) 단자를 가진 다수의 발광소자(패널구성)로 구성되어 있으며, 캐소드와 애노드에 인가되는 전압에 따라서 발광상태가 결정되는 표시장치로서, 유기 EL(electro-luminescence) 장치의 구동회로는 단순 매트릭스(MATRIX) 구조를 사용하고 있다.

도 1은 종래 사용되는 단순매트릭스방식의 유기 EL 장치의 개략적인 구성도로서, 세그먼트 드라이버(3)는

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[English Translation of Korean Unexamined Utility Model No. 1999-30880]

A DRIVING CIRCUIT OF ORGANIC EL (ELECTRO-LUMINESCENCE) DEVICE (Applicant : LG ELECTRO COMPONENTS CO.)

FIELD OF INVENTION

The present invention relates to a driving circuit of organic electro-luminescence (EL) device, more particularly to a driving circuit of organic EL device which is configured to extend the life of organic EL device by applying inverse voltage to prevent accumulation of charge caused by using DC power supply, and to remove any difficulty in showing moving images in the organic EL device even in case of applying inverse voltage.

BACKGROUND OF THE INVENTION

As a display device, conventional organic electro-luminescence (EL) devices are configured with a plurality of luminous elements having cathode and anode terminals (panel configuration) to determine luminous state according to the voltage that has been applied between cathode and anode; moreover, simple matrix structure is generally used for the driving circuit of organic EL device.

FIG. 1 is a schematic configuration view of conventional organic EL devices with simple matrix type. Here, segment drive 3 is connected to constant-current drive 5 and also to the anodes of EL panel (element), and it is driven in the manner that an output of constant-current drive 5 is controlled "on/off" according to the type of data. Furthermore, common drive 1 is connected to the cathode of EL panel, and the EL element emits light according to the output signal from common drive 1 to display specific information.

FIG. 2A and FIG. 2B are circuit drawings showing an example of embodiment for conventionally used common and segment driver portion circuits. As shown in the drawings, it is configured with a segment driver portion (FIG. 2B) comprising transistors Q1 and Q2 which are connected to each other to generate current and voltage Vdd for driving an EL device, a resistor R for regulating the amount of

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constant-current, and a transistor Q3, which is connected to segment drive 3, for controlling the operation of EL panel, and a common driver portion (FIG. 2A) comprising transistor Q4, which is connected to common drive 1, for controlling the operation of EL panel.

5 However, the organic EL device with the above configuration has a problem in that charges are accumulated on the transistor while it is operated for a long period of time, thereby to reduce the life of EL cells, since the applied voltage Vdd is direct current (DC). In order to solve this problem, it uses a conventional method of applying inverse voltage to overall cells for every constant period of time; however,
10 this operation should be performed for every constant period of time, thus causing a problem of displaying uncomfortable images, since moving images are not smoothly linked in showing moving images using an organic EL device. Moreover, additional circuit components may be required for applying inverse voltage; accordingly it has a problem that working process takes long while producing organic EL devices,
15 thereby increasing the production cost.

SUMMARY OF THE INVENTION

The present invention is devised to solve the above problems, and an object of the present invention is to provide a driving circuit of organic EL device which is
20 configured to extend the life of organic EL device by applying inverse voltage to prevent accumulation of charges caused by using DC power supply, and to remove any difficulty in showing moving images in the organic EL device even in case of applying inverse voltage.

BRIEF DESCRIPTION OF THE DRAWINGS

25 FIG. 1 is a schematic configuration view of conventional organic EL devices.

FIG. 2A is a circuit diagram of the common driver portion, and FIG. 2B is a circuit diagram of the segment driver portion.

FIG. 3A is a circuit diagram of the common driver portion according to the
30 present invention, and FIG. 3B is a circuit diagram of the segment driver portion according to the present invention.

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DETAILED DESCRIPTION OF THE INVENTION

According to the present invention, there is provided a driving circuit of organic EL device comprising a common drive, a segment drive, and a constant-current drive for driving an EL element, wherein a means of applying voltage (V_{dd}) is connected to a plurality of selective lines of the common driver portion, thereby applying low voltage to perform "on/off" control according to the output data from the segment drive when the line is selected, or applying high voltage when the line is not selected.

Now, an embodiment of the driving circuit of organic EL device according to the present invention will be described in detail with reference to the attached drawings.

In the configuration of the present invention as shown in FIG. 3A and FIG. 3B, transistors Q5 and Q6 for generating constant current source are connected to each other, and resistor R1 for controlling the amount of constant current is connected to the collector of transistor Q5 in the segment driver portion shown in FIG. 3B. Also, the collector of transistor Q6 is connected to the anode of EL panel and to the emitter of transistor Q7 respectively. On the other hand, the collector of transistor Q8 in the common driver portion shown in FIG. 3A is connected to the cathode of EL panel and resistor R2 respectively, and resistor R2 is connected to DC voltage V_{dd} . Here, an NPN type is used for transistor Q8.

First, the operation of segment driver portion (FIG. 3B) will be described as follows:

The base of transistor Q7 is connected to segment drive 3, and transistor Q7 is controlled according to the data outputted from segment drive 3. In other words, constant current supply to the EL panel is turned on/off according to the on/off state of transistor Q7.

When the data from segment drive 3 is high, transistor Q7 is disabled and constant current controlled through transistors Q5 and Q6 will be input to the anode side of EL panel. Also, when the data from segment drive 3 is low, transistor Q7 is enabled and constant current will not be supplied to the anode side of EL panel, and then the anode side is held in at low state.

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On the other hand, the operation of common driver portion (FIG. 3A) will be described as follows:

When high signal is input to the base terminal of transistor Q8 which is connected to common drive 1, transistor Q8 is enabled, and the state of the cathode side of EL element, which is connected to the collector of transistor Q8, will be changed to low. At this time, the on/off state of cells will be determined according to the state of segment driver portion since all cells of EL panel at the side of row connected to this terminal are enabled.

Furthermore, when low state is input to the base terminal of transistor Q8, transistor Q8 is disabled and the cathode of EL panel connected to the collector of transistor Q8 will be held in high state according to DC voltage Vdd and resistor R2 which is connected to transistor Q8. It will be understood that inverse voltage is applied to a cell according to the state of segment driver portion. In other words, there is an effect of discharging the capacitance that has been stored since inverse voltage is applied to a cell. It is noted that transistor Q8 is configured with an NPN type transistor for this purpose, which is different from other transistors in the circuit.

Now, an explanation will be made in connection with the operation of the driving circuit of organic EL device as shown above.

First, for a line of row side in which common drive 1 is enabled, the on/off state of cells will be determined according to the data state outputted from segment drive 3; and for a line of row side in which the common driver portion is disabled, the cathode side of EL panel will be held in high state, and the anode side will be determined as high or low according to the data state from segment drive 3.

When the number of overall lines connected to the row side is "N," one line will be enabled and the state of other "N-1" lines will be determined by the data outputted from segment drive 3. Therefore, it can have an effect of applying inverse voltage automatically. Of course, it does not mean that inverse voltage will apply to overall EL panel at the same time, but only that the probability of applying inverse voltage will be higher. By applying the above-mentioned invention, the number of circuit components can be reduced and the speed of displayed screen can be increased.

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In the above embodiment, it is described that inverse voltage is applied to the lines of common driver portion which are disabled by using DC voltage Vdd and resistor R2, but it is apparent to those skilled in the art that it may be configured with an element other than a resistor, for example, an analog switch. Also, it can be
5 configured with using a transistor.

According to the present invention as mentioned above, it has an advantage to extend the life of organic EL device by applying inverse voltage for preventing the stored charge caused by using DC power supply, and to remove any difficulty in showing moving images in the organic EL device even in case of applying inverse
10 voltage.

What is claimed is:

1. A driving circuit of organic EL device comprising a common drive, a segment drive, and a constant-current drive for driving an EL element, wherein a
15 means of supplying voltage (Vdd) is connected to a plurality of selective lines of the common driver portion, thereby supplying low voltage to perform "on/off" control according to the output data received from the segment drive when the line is selected, and supplying high voltage when the line is not selected.

2. The driving circuit of organic EL device of claim 1, wherein a means of
20 supplying said voltage (Vdd) is a resistor (R1).

3. The driving circuit of organic EL device of claim 1, wherein a means of supplying said voltage (Vdd) is an analog switch.

4. The driving circuit of organic EL device of claim 1, wherein a means of supplying said voltage (Vdd) is a transistor.

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ABSTRACT

The present invention relates to a driving circuit of organic electroluminescence (EL) device, more particularly to a driving circuit of organic EL device which is configured to extend the life of organic EL device by applying inverse voltage for preventing the stored charge caused by using DC power supply, and to remove any difficulty in showing moving images in the organic EL device even in case of applying inverse voltage.

In the present invention, there is provided a driving circuit of organic EL device comprising a common drive, a segment drive, and a constant-current drive for driving an EL element, wherein a means of supplying voltage (Vdd) is connected to a plurality of selective lines of the common driver portion, thereby applying low voltage to perform "on/off" control according to the output data from the segment drive when the line is selected, or applying high voltage when the line is not selected.